

2006 RESEARCH PROBLEM STATEMENT

Problem Title: Fish Passage at Utah Culverts: Strategy, Assessment, and Design

No.:06.09-1

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1. Briefly describe the problem to be addressed:

There appears to be no Agency strategy or pilot database in place to guide assessment of aquatic organism passage, or even fish passage, at UDOT culverts, nor does there appear to be a design procedure in place for this objective. State Departments of Transportation are becoming more involved in providing passage for aquatic organisms (amphibians and fishes) at culverts in response to endangered species listings, other agencies' initiatives, and the desire to restore ecosystem connectivity to watercourses. UDOT is responsible for approximately 61,000 culverts, but aquatic organism and fish passage is currently addressed only on an as-needed basis, sometimes resulting in unanticipated consequences. For example, a recent culvert replacement project in Logan Canyon resulted in the elimination of all fish of interest upstream from the culvert because the design specification of using a corrugated metal pipe culvert was changed to a plastic pipe in the field. The smooth interior increased velocities so much that fish could not pass upstream. An assessment strategy and design procedure for aquatic organism or fish passage at UDOT culverts is needed.

2. List the research objective(s) to be accomplished:

1. Develop a strategy for prioritizing culverts for aquatic organism or fish passage
2. Determine an appropriate assessment protocol for Utah and test it in the field
3. Create a pilot database of assessment for UDOT to build upon based upon the results from Objective 2
4. Develop a design procedure that allows for aquatic organism or fish passage through culverts.

3. List the major tasks required to accomplish the research objective(s):

Estimated person-hours

1. Meet with relevant Federal and State Resource agencies to strategize a culvert assessment prioritization scheme – **40 hours**
2. Using the prioritization scheme, identify the most urgent regions within the UDOT system for culvert assessment – **800 hours**
3. Review current assessment protocols and design procedures for potential implementation in Utah. Dr. Hotchkiss is compiling such protocols and procedures as part of a current FHWA-funded project on the design of bridges and culverts for fish passage – **80 hours**
4. Use the candidate protocol(s) on a representative sample of culverts and field verify assessment accuracy by performing fish counts – **1100 hrs**
5. Develop a GIS database of results and assessment outcomes – **500 hours**
6. Develop a draft procedure for the design of culverts for aquatic organism and/or fish passage – **280 hours**
7. Write a project report documenting results and recommending future actions; develop and provide training to UDOT personnel – **300 hrs**

4. Outline the proposed schedule (when do you need this done, and how we will get there):

The project will require 18 months. Tasks 1-3 will be completed within 5 months. The field campaign (Task 4) will take seven months and will require a summer sampling season to assure access to the selected culverts. Two months will be needed to develop the database and draft a design procedure (Tasks 5 and 6), and four months are allowed for review of the draft and final reports.

5. Indicate type of research and / or development project this is:

Large: ☒ Research Project ☐ Development Project
Small: ☐ Research Evaluation ☐ Experimental Feature ☐ New Product Evaluation ☐ Tech Transfer Initiative :
☐ Other

6. What type of entity is best suited to perform this project (University, Consultant, UDOT Staff, Other Agency, Other)?

University in collaboration with UDOT and relevant agencies

7. What deliverable(s) would you like to receive at the end of the project? (e.g. useable technical product, design method, technique, training, workshops, report, manual of practice, policy, procedure, specification, standard, software, hardware, equipment, training tool, etc.)

1. A project report documenting all work
2. A GIS database of culvert assessments for use in the future and a draft design procedure for culvert design for aquatic organism or fish passage
3. Training for UDOT employees in use of assessment protocols, database construction, and culvert design

8. Describe how will this project be implemented at UDOT.

Task 4, performing field assessments, will be done with as much participation from UDOT personnel as their time and budget will allow. This will enable them to become familiar with the techniques that they can use in the future. Near the end of the project, a formal training program will be provided to all interested employees of UDOT and other agencies for culvert assessment and design. The pilot database of assessments will be maintained and grown as UDOT personnel continue the process of culvert assessment in the future.

9. Describe how UDOT will benefit from the implementation of this project, and who the beneficiaries will be.

UDOT staff will have knowledge on how to continue the assessment program in the future. The culvert assessments can be used to prioritize fish and/or aquatic organism-friendly culvert replacements or retrofits. This strategy will save time and money. Other Federal and State Resource agencies can coordinate culvert replacements with UDOT, providing stream connectivity within a watershed that has multiple agency jurisdictions. The draft design procedure will provide UDOT hydraulic engineers a tool for specifying new culverts that will pass aquatic organisms and/or fish. Finally, the citizens of Utah will benefit from a long-term sustained fish and aquatic organism populations.

10. Describe the expected risks, obstacles, and strategies to overcome these.

Potential Obstacle

-Interagency disagreement on priorities for assessment
-Extreme weather (flood or drought) that would make access to candidate culverts impossible

Overcoming the Potential Obstacle

Meetings early and often in the project; interagency review of work
Be prepared to re-align the field sampling program as needed

11. List the key UDOT Champion of this project (UDOT employee who will help Research Division steer and lead this project, and will spearhead the implementation of the results):

Michael Fazio, Brent Jensen, and Denis Stuhff

12. Estimate the cost of this research study including implementation effort (use person-hours from No. 3): \$74,000

13. List other champions (UDOT and non-UDOT) who are interested in and willing to participate in the Technical Advisory Committee for this study:

Name	Organization/Division/Region	Phone
A) Tom Chart	Senior Fisheries Biologist, U.S. Fish and Wildlife Service	801-975-3330
B) Don Wiley	Fisheries Biologist, Utah Division of Wildlife Resources, Central Region	801-491-5678
C) Kris Buelow	JSRIP Local Recovery Program Coordinator, Central Utah Water Conservancy District	801 226-7132
D) Dan Duffield	Regional Fish Program Manager, U.S. Forest Service	801-625-5662
E)		
F)		

14. Identify other Utah agencies, regional or national agencies, or other groups that may have an interest in supporting this study:

CUP Completion Office, Utah Department of Natural Resources Species Recovery Program, Utah Reclamation Mitigation and Conservation Commission, Federal Highway Administration